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MULTIPLE PATIENT ADMISSIONS TO NORTH CAROLINA GENERAL HOSPITALS DURING 1980

by

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Introduction

For calendar year 1980 nearly 900,000 North Carolina hospital discharge records were assembled from several sources, representing about 93 percent of short-stay general hospital inpatients during that year. A previous publication in this series (1) contains a description of how this information was collected and also selected tabulations of the discharge data. While information on discharges does provide a good portrayal of the demand for hospital beds, it might also be useful to know the number of individual patients that generated these hospital discharges. For example, 25 hospitalizations might be caused by a specific disease during a year, but this could represent anywhere from one to 25 different patients. While the number of discharges by one patient during a year could be an indicator of severity of illness, for some purposes — such as assessing the level of morbidity in a population — it would be more useful to count persons rather than discharges. It should be recognized, however, that disease patterns among hospitalized persons do not necessarily reflect morbidity in the community at large (2,3).

This brief report examines the degree of multiple hospitalization for patients grouped by age, race, sex, diagnosis group, and hospital size. The results are then compared to those found in other studies of multiple hospitalization.

Method

The only way to "unduplicate" hospital discharges is through the use of some patient identifier. Many of the 1980 discharge records did contain a nine-digit patient number, though we have absolutely no way to link this number to a patient's name without further information from the hospitals. Preliminary tabulations of the number of times the same patient number appeared among the records within each hospital were first carried out. If a hospital had no duplicate patient numbers within its discharge records then it was assumed that the same patient number was not assigned to a person every time he was admitted during the year and the records for that hospital were excluded from the study. For the remaining hospitals a short survey form was sent to the director of medical records to confirm that the same patient number was used for a person each time he was admitted during the year and that this was also true for newborns for subsequent readmissions. We found that 49 of the 101 hospitals for which we had data with patient numbers did use such a "unit numbering system." These 49 hospitals account for about 507,000 of a total of 962,000 general hospital inpatient discharges (from all 134 general hospitals) during 1980. An assessment of the coverage achieved by the 49 hospitals is shown below. Overall, 37 percent of the 1980 short-stay general hospitals are included, though this ranges from 22 percent for hospitals with less than 100 beds to 80 percent for hospitals with 400 or more beds. Since the larger hospitals are overrepresented, the overall percent of discharges covered in this study is 53.

bed size	# in state	# in study	% in study
0- 99	59	13	22.0
100-199	41	15	36.6
200-399	19	9	47.4
400+	15	12	80.0
Total	134	49	36.6

Of the 507,000 discharges included here, 231,000 were in hospitals with less than 400 beds and 276,000 were in hospitals with 400 or more beds. The 49 hospitals are spread fairly evenly across the state, except for HSA Region V (southeastern N.C.) which has only two hospitals included.

All of the tabulations that follow are based on the data for these 49 hospitals. Though strictly speaking the data used here are for discharges during 1980, the terms "admissions" and "discharges" are used interchangeably since the two numbers are very close for short-stay hospitals. The readmission rates shown below will understate the actual extent of multiple hospitalization by the same person since only readmissions to the same hospital during 1980 are counted. Each hospital in North Carolina has its own patient numbering system and the same number is not retained for a patient if he is admitted to two different hospitals.

Results

For discharges from the 49 hospitals for which we had usable data, the percent of total discharges during 1980 (excluding normal newborns) that were readmissions was 19, though this percent ranged between 10 and 30 for the individual hospitals. The percent of normal newborns readmitted later during the year was only 5.9, and so it was decided to exclude this group from tabulation to avoid deflating the readmission rates, particularly for the under-15 age group. (The overall readmission rate including normal newborns was 18 percent.) The 49 hospitals represented in this study had a total of 463,000 non-newborn discharges in 1980, out of a statewide total of 886,000.

Table 1 shows the percent distribution of patients by number of admissions during 1980. Eighty-four percent were admitted one time, with 16 percent being admitted two or more times. This 16 percent of the patients accounted for 32 percent of all hospital admissions, considering their first and subsequent admissions during 1980. While only 0.3 percent of patients had 6 or more admissions, these patients accounted for over 18,000 hospital admissions during 1980, extrapolating from the 49 hospitals for which we have data to all general hospital admissions (excluding normal newborns).

Table 1

1980 N.C. Hospital Patients by Number of Admissions to the Same Hospital*
(Normal Newborns Excluded)

	Percent of Patients
1 Admission	83.8
2 Admissions	12.1
3 Admissions	2.7
4 Admissions	0.8
5 Admissions	0.3
6 or More Admissions	0.3
Total	100.0

*Based on data from 49 N.C. hospitals in our data base whose patient numbering systems allow for unique patient identification.

Table 2 shows readmission rates by age, race, sex, and size of hospital. This is computed as the percent of all admissions that are readmissions. As one might expect, the readmission rate increases with age, and it is over 25 percent for persons age 65 and over. The readmission rates are remarkably similar for the race, sex, and hospital-size groups. A study of multiple admissions in Missouri (4) found that, overall, smaller hospitals had higher readmission rates than larger hospitals. One might expect that the female readmission rate is lower than the male rate because of the inclusion here of women having normal deliveries among whom there are probably relatively few readmissions. But in fact the female rate was slightly lower than the male rate for each age group, except for under-15 where the two rates were almost the same (not shown in Table 2).

Table 2

1980 N.C. Hospital Readmission Rates by Age, Race, and Sex, and Size of Hospital*
(Normal Newborns Excluded)

	Readmission Rate**
Age	
under 15	13.1
15-44	14.6
45-64	22.1
65 and over	25.5
Race	
White	19.0
Nonwhite	19.1
Unknown	16.3
Sex	
Male	20.0
Female	18.2
Hospital Size	
Under 400 beds	19.0
Over 400 beds	18.9
ALL PATIENTS	19.0

*Based on data from 49 N.C. hospitals in our data base whose patient numbering systems allow for unique patient identification.

**This rate is the percent of total admissions that are readmissions to the same hospital.

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Table 3 shows readmission rates for selected principal discharge diagnosis groups, and there is substantial variation here. If a patient were admitted twice to the same hospital with the principal diagnosis in a different group each time, this would **not** be counted as a readmission in Table 3, unlike in the previous tables. One can see that for malignant neoplasms, nearly one-third of the 1980 admissions are readmissions to the same hospital, while for perinatal problems the percent is only 1.8. In this latter diagnosis group there could be a relatively large proportion of deaths after the first admission, which could help explain the low rate. Overall, only about 2 percent of discharges are deaths, so this should not lower the readmission rate appreciably for most diagnosis groups.

Table 3

1980 N.C. Hospital Readmission Rates by Principal Diagnosis Group*

(Normal Newborns Excluded)

Group	ICD-9-CM Codes	Readmission Rate
Malignant Neoplasms	140-208	30.1
Diseases of the Blood	280-289	18.6
Diseases of Circulatory System	390-459	15.8
Mental Disorders	290-319	14.6
Congenital Anomalies	740-759	11.5
Diseases of Respiratory System	460-519	11.4
Endocrine, Nutritional, Metabolic Diseases	240-279	10.4
Complications of Pregnancy	630-676	9.3
Diseases of Genitourinary System	580-629	8.2
Diseases of Digestive System	520-579	8.0
Diseases of Musculoskeletal System	710-739	7.8
Diseases of Nervous System	320-389	7.7
Diseases of the Skin	680-709	5.7
Benign and Unspecified Neoplasms	210-239	5.1
Symptoms, Signs, and Ill-Defined Conditions	780-799	4.7
Accidents, Poisoning, and Violence	800-999	4.2
Infectious and Parasitic Diseases	001-139	2.6
Certain Perinatal Problems	760-779	1.8

*Readmissions by a patient to same hospital with same **principal diagnosis** group are counted, as a percent of total admissions for that principal diagnosis. Based on data from 49 N.C. hospitals in our data base whose patient numbering systems allow for unique patient identification.

Discussion

Other studies also show readmission rates in the range of 20 percent. The Capital Area (N.C.) Professional Standards Review Organization (PSRO) calculated in 1980 that 22 percent of federal hospital admissions in their area over the course of a year were readmissions by the same person, though this varied from 10 to 45 percent for individual hospitals (*2*). Watts and Acheson (*5*) found in 1967 in Oxford, England that the average readmission rate for the nineteen diagnoses that they examined was 24 percent, though for cancer of the cervix over half of the hospital admissions during a year were readmissions of the same person for the same diagnosis. This English study did, however, consider readmissions across different hospitals and would therefore be expected to show a higher readmission rate than the present report. A recent study of multiple hospitalization in Missouri (*4*) showed an overall 1976 rate of readmission to the same hospital of only 8.2 percent, though this was based on discharge data for just 14 hospitals.

The readmission rates shown here could be applied to other hospital discharge data sets that do not contain patient identification numbers in order to estimate the number of **persons** represented by the discharges for a given diagnosis. It should be noted again, however, that only readmissions to the same hospital are counted, and therefore the actual readmission rates will be understated. Also, morbidity rates for persons that are hospitalized for a certain condition may be a poor indicator of the prevalence of morbidity in the general population, except for those diseases where virtually all patients with the disease require hospitalization during a year.

The data presented here should be used for general guidance in understanding the relationship between the number of hospitalizations and the number of persons hospitalized. These results indicate that for some diagnosis groups hospital discharge data that contain both first admissions and readmissions can provide an adequate measure of the number of persons involved, while for other diagnosis groups where the readmission rate is high the hospital discharge records may not be sufficient for person-oriented epidemiologic studies.

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